

## Preface

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One of the big problems in the cadastral domain is the lack of a shared set of concepts and terminology. International standardization of these concepts (that is, the development of an ontology) could possibly resolve many of these communication problems. There are several motivations behind these standardization efforts, such as meaningful exchange of information between organizations, or efficient component-based system development through applying standardized models. It should be emphasised that a cadastral system entails land registration, the 'administrative/legal component', and (geo referenced) cadastral mapping, the 'spatial component'. Together, these components facilitate land administration and a land registry/cadastral system provides the environment in which this process takes place. Data are initially collected, maintained and, probably the most relevant issue in standardization: disseminated in a distributed environment, which in principle means that data could be maintained by different organizations, such as municipalities or other planning authorities, private surveyors, conveyancers and land registrars — depending on the local traditions. Standardization of the cadastral domain is in the initial phase and many non-co-ordinated initiatives can be identified.

### 1. GOALS OF THE WORKSHOP

As indicated above standardization of the cadastral domain serves several purposes. In order to develop this, the workshop will try to bring together representatives from different communities and disciplines involved in the cadastral domain: legal specialists, surveyors, ICT-specialists, etc. from different organizations (land registry and cadastral organizations, standardization institutes, industry and academia). An initial model has been developed based on the results of a first workshop (Lemmen et al., 2003) and will be used as a reference for further development. However, the workshop is not limited to this specific model alone and also includes (1) efforts at the national level that do not (directly) aim at an international standard, (2) work that goes beyond the current scope of the core cadastral model and addresses for instance process modelling.

The specific goals for this workshop are to bring together the different communities, publish the results (in this book) and standardize the cadastral domain model, with emphasis on:

1. Further developing the administrative/legal aspects of the model: rights of persons to lands, customary and so called 'informal rights', 3D aspects, legal and survey based source documents;
2. Further formalizing the model (semantics ontology, knowledge engineering);
3. Testing the current model in different countries (evaluation);
4. Involving the geo-ICT industry and standardization institutes (support for implementations of the model).

Of great importance for the implementation of interoperable cadastral and land information data could be the Land Information Initiative of the OpenGeospatial Consortium (OGC), covering among others the translation between LandXML and Geography Markup Language (GML) XML encodings of relevant object classes.

## 2. FORMAT OF THE WORKSHOP

The workshop will consist of a mixture of presentations and discussion (PD) sessions and sub-workgroup (SWG) sessions on specific themes, according to the following format:

- 9 December 2004, morning: two PD sessions
- 9 December 2004, afternoon: four parallel SWG sessions, and one PD session
- 10 December 2004, morning: one PD session, one block (continued) of parallel SWG sessions
- 10 December 2004, afternoon: one PD session, one closing session (results of SWG sessions)

## 3. MOTIVATION

Standardization of the cadastral domain is relevant because computerized cadastral systems can support a customer and market-driven organization with changing demands and requirements. Customers want to have an efficient on line information service that links to the database(s) of cadastral organizations. The application software to support cadastral processes is extending continuously in many countries because of changing requirements. In the future the volume of cross border information exchanges are expected to increase, particularly within the European Union. The more remote that the data user is from the data source, the more important it becomes to ensure that the data are well defined — for the obvious reason that remote users are likely to have much reduced local knowledge to assist them in interpretation. Trying to make the meaning of the data explicit is therefore an important step in facilitating meaningful exchanges of information across greater distances. The concepts used have to be well defined and structured (that is, related to one other), and this entails development of a cadastral domain ontology. One potential way to express parts of this ontology is UML (Unified Modeling Language) class diagrams.

Cadastral data that are accessible in a computerized environment can (significantly) increase the demand for cadastral data in the cadastral market. Standardization definitively contributes to efficient development and renewal of cadastral systems, also in developing countries. Many land registry or cadastre organizations implemented their computerized systems between 10 and 20 years ago. These systems are now outdated, and their maintenance is complex and expensive. The organizations are now increasingly confronted with rapid developments in the technology: there is a *technology push* driven by developments in the Internet, (geo-)databases, modeling standards, open systems, GIS; and a *market pull* driven by an increasing demand for enhanced user requirements, e-governance, sustainable development, electronic conveyancing, and integration of public data and systems. A great deal of effort is being devoted to the development of viable strategies for the modernization

of the ICT systems of land registry and cadastral organizations. Standardization in the cadastral domain would help (geo-)ICT vendors, as it would allow them to invest their efforts in the development of a (generic) system, based on the concepts as described in UML class diagrams, instead of focusing on a single cadastral organization. This would stimulate the availability of generic (object-oriented) standard software from multiple (geo-)ICT vendors from which the cadastral organizations can make a selection. This will provide them with the fundament of new systems (in ways that are largely compatible with the concepts used in other countries), without developing everything from scratch: only local modification and extensions would need to be developed.

Whilst access to data, its collection, maintaining and updating should be facilitated at a local level, the overall land information infrastructure should be recognized as belonging to a uniform national service so as to promote sharing within and between countries. A core cadastral domain model in which classes and associations between classes representing objects, attributes and operations are derived from different tenure systems could, in the opinion of the workshop organizers, definitively contribute to the efficient fulfillment of local cadastral needs. To summarize, a standardized core cadastral domain model will serve at least two important goals: it will avoid re-inventing and re-implementing the same functionality over and over again, instead it will provide an extensible basis for efficient and effective cadastral system development, *and* it will enable stakeholders, both within one country and between different countries, to engage in meaningful communication based on the shared ontology implied by the model.

## REFERENCES

Lemmen, C., P. van der Molen, P. van Oosterom, H. Ploeger, W. Quak, J. Stoter, and J. Zevenbergen, (2003). A modular standard for the Cadastral Domain, Digital Earth 2003 - Information Resources for Global Sustainability The 3rd International Symposium on Digital Earth, 21-15 September 2003, Brno, Czech Republic.